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Dated: November 3, 2009 Signature: _____
(Eileen Sheffield)

Docket No.: DNAG-278 (10402028)
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of: Ilya Ostrovsky

Application No.: 10/781,973

Group Art Unit: 1795

Filed: February 18, 2004

Examiner: Leader, William T.

For: METHOD OF ANODIZING METALLIC
SURFACES AND COMPOSITIONS
THEREOF

Commissioner for Patents
P. O. Box 1450
Alexandria, VA. 22313-1450

Dear Sir:

DECLARATION UNDER RULE 132

Sir:

1. I, Ilya Ostrovsky, studied chemical technology at Institute of Chemical Technology at Dnepropetrovsk – today called Ukrainian State University of Chemical Technology – and acquired a master of science in chemical technology. I am presently employed as R&D Director at Lightest sprl. (Belgium), and I am presently performing development of magnesium surface treatment technologies at Chemetall GmbH at Frankfurt am Main (Germany) because of service agreement. I had been employed by Alonim Holding for more than 9 years in the field of magnesium alloys and the development of corrosion resistant coatings. I am still scientific and technological Chief of AMTS (Advanced Magnesium Technologies and Solutions) in Israel which is owned by Alonim Holding in the field of Surface Treatments. I am concerned with the corrosion resistance of magnesium alloys coated with different aqueous compositions and with anodizing processes like those of the above-captioned patent application. I am the named inventor in the above-captioned patent application.

2. I am familiar with the above mentioned patent application, and I am familiar with the Office Action dated July 14, 2009. I have reviewed all of the cited references with a particular focus on Dolan (US 6,916,414), Schaedel (US 4,152,221), Honda et al. (US 6,690,573), Covino (US 4,861,440) and Lowenheim text for Electroplating.

3. **Dolan (US 6,916,414)** protects a method of forming a protective coating on a surface of a light-metal-containing article comprising providing an anodizing solution comprised of water and one or more additional components selected from the groups of a) oxysalts of Mn, Zr, Ti, V and Hf, b) complex fluorides of Ti, Zr, Hf, Si, Sn, Al, Ge and B, providing a cathode in contact with said anodizing solution, placing said light-metal-containing article as an anode in said anodizing solution and passing a pulsed current having an average voltage of not more than 250 volts between the anode and cathode through said anodizing solution for a time effective to form said protective coating on said surface. According to my understanding, the teaching of the present application is – if at all – near to the Embodiments A and B of Dolan.

4. Dolan (US 6,916,414) teaches for Embodiment A (columns 4 and 5) an anodizing solution comprising water, water-soluble or water-dispersible phosphorus oxysalt and water-soluble amine. The amines include alkanolamines having the general formula of $\text{NH}_2\text{-R-OH}$ (hydroxo and amino functional groups on alkane backbone) and polyetheramines like JEFFAMINE® having the similar formula but the amino groups are attached to the end of polyether backbone.. The amine content shall be about 0.05 to about 1 moles/liter, which means 7.5 to 149.2 g/L for triethanolamine. These amines are clearly different from the alcohols of the present application, which have a general formula. The alcohols of the present application shall be used as stabilizators for micellos in disclosed anodizing process, but I am not familiar with the application of polyols for this purpose. The phosphorus oxysalt content of Dolan shall be at least 0.3 moles/liter (=M), which means at least 29.4 g/L for ortho-phosphoric acid. There may be a content of Li, K or Na, but ammonia shall be avoided according to the teaching of col. 1, last but one paragraph, as it is volatile and corrosive. In the there following paragraph it is described that a phosphate concentration greater than 0.2 M should be avoided because of surface appearance problems. But according to the present application, there do not occur problems like these for ammonia and ammonium contents respectively for a content of phosphorus oxysalts. Further on,

the present application does not teach that there is the need to use an amine in the anodizing solutions. By the use of such anodizing solutions of Dolan, there shall be used a “sustained “plasma”” during the anodization. Generally it is attained using pulsed DC having an average voltage of no more than 150 volts.

5. Dolan (US 6,916,414) teaches for Embodiment B (column 5) an anodizing solution comprising water, water-soluble or water-dispersible silicon oxysalt (e.g. silicate, alkali metal salts of silicic acid, but no silanes or similar substances are indicated). The silicon atom concentration shall be at least about 0.4 M, which means at least 88.9 g/L for an ureido propyl silane (calculated for 1-[3-(Trimethoxysilyl)propyl]urea, $C_7H_{18}N_2O_4Si$) and which is much more than disclosed in the present application (“the concentration of the hydrolyzed alkaline silanes in the anodizing solution is in the range from 0.1 g/L to 50 g/L”). These anodizing solutions of Dolan may have a pH of 8 to 12 and shall be essentially free of alkali metal hydroxide and/or fluorides and/or fluorosilicates. Even there, there shall be used a pulsed DC having an average voltage of no more than 100 volts to gain a sustained plasma during anodization. Of course, Dolan teaches other embodiments of different chemical compositions and other electrical conditions to be applied.

6. Therefore, the Embodiments A and B of Dolan do not teach to use a direct current for similar anodizing solutions. Further on, the Embodiments A and B of Dolan do not teach to use chemical compounds for stabilization pores. Finally, Dolan does not teach to add a surfactant, an alcohol or an alkaline hydrolyzed silane to the anodizing solution, nor any formation of non-conductive polymer. Non-conductive polymer is not added. It is formed on initial stage of the anodizing process of the present application.

7. **Schaedel (US 4,152,221)** describes an anodizing method for producing aluminum oxide coatings of greater thickness than the prior art at a relatively rapid rate (col. 2, lines 31-35). This method shall be used for the continuously anodizing of aluminum (col. 2, lines 48-50). The electrolyte solution of Schaedel contains preferably a dilute sulfuric acid solution of 15-25% sulfuric acid and 3-10% of surfactant, preferably a lignin wood sulfonate solution (col. 3, lines 56-65). In alternative thereto, e.g. a phosphoric acid may be added and further on a triethanolamine or alcohol (col. 4, line 66 to col. 5, line 28). Triethanolamine has the general

formula $C_6H_{15}NO_3$, but is no alcohol. Furtheron, a surface acting wetting agent may be added “which forms a complex with the part 9 being processed to produce therearound an oxygen holding foam 44” (col. 5, lines 38-55). Therefore, the surfactant of Schaedel is used to produce a foam, whereas the surfactant of the present application is used for better wetting of metal substrate and stabilization of pores during anodizing process, whereby foam would generate problems such that sparking and leak of electrocistivity in the foam layer. Furtheron, the electric conditions are: AC, a pulsed voltage having approximately 70 ASP which means the value in amperes equal 70 times the area in square feet of the portion of the part to be anodized, which is equal to a current density of 7.535 A/dm^2 (col. 6, lines 56-64, col. 8, lines 6-21, col. 9, lines 11-23), as 1 square foot corresponds to 9.29029 dm^2 . Finally, there is generated an Al_2O_3 coating (col. 9, line 66 to col. 10, line 5), but not a coating containing at least the three compounds MgO , $Mg(OH)_2$ and $Mg_3(PO_4)_2$ and components selected from the group of oxides, hydroxides, phosphates, polymers and silicon containing substances as of the present application.

8. **Honda et al. (US 6,690,573)** describes an electrolytic separator, which is an electric component having an anode foil and a cathode foil. A gel-like polymer is to be filled into this element to firmly to be firmly attached to an inside (Abstract). Therefore, Honda et al. teaches to add a non-conductive polymer to the separator. It contains an electrolytic solution and a polymer in which the electrolytic solution is infiltrated (col. 2, lines 22-33). The gel-like polymer shows a semi-solid-state after infiltration on an electrolytic solution, and constructs a skeleton having many pores in which a conductive electrolytic solution may be impregnated (col. 2, lines 46-49). The gel-like polymer can firmly attach the capacitor element to an internal surface of the metal case (col. 2, lines 64-66). The gel-like polymer contains the electrolytic solution having ion conductivity within the polymer polymerized both in the interior and exterior of the capacitor element by using polymerization initiators (col. 3, lines 37-45). There may be used a copolymer of acrylic esters, whereby organic peroxide as polymerization initiator may be used for the generation of bubbles in the gel (col. 10, lines 12-41). According to col. 12, lines 57-62, a conductive gel-like polymer 14 is infiltrated inside the capacitor element 11, functioning as an electrolyte, and it fills a part of the element and also fixes the bottom and the inner wall of the metal case 16 by adhesion, achieving a function as a fixing member. Therefore, the gel-like polymer of Honda et al. has quite different compositions, properties and tasks and is differently

generated than the non-conductive polymer containing layer of step g) of the present application which is transformed to a gel layer in which gel micelles are oriented according to the electro-magnetic field. Here, big bubbles or other big pores in the gel-layer would disturb.

9. **Covino (US 4,861,440)** discloses a process for making an improved aluminum article having an intermediate layer of porous coarsely crystalline aluminum oxide integral with the aluminum substrate (Abstract). In contrast thereto, the coating of the present application is amorphous. According to col. 1, lines 58-68 of Covino, the intermediate layer comprises highly cellular elongated crystals that are in the form of hollow tubular dendrites densely packed on the surface of the inner layer of aluminum, which are formed by steadily and continuously increasing the voltage of the impressed current from the start to the finish of the electrolytic process from a voltage of about 5-15 volts to about 65-85 volts. Further on, the bath is highly agitated and high concentrations of dissolved oxygen are maintained in the bath by passing large quantities of air through the bath to provide the agitation and oxygen requirements of the bath (col. 3, lines 41-51). There, a conventional wetting agent can also be added to the bath. The expert in the art knows that octylphenol ethoxylate (=Triton X-100) is an excellent foam former in an aqueous solution (data sheet: Foam Height 128/107). The acidic solution for the first treatment shall be slightly acidic (col. 4, lines 54-68). For the second treatment, the aqueous solution shall be slightly acidic too (col. 5, lines 34-60). In contrast thereto, the bath of the present application is kept under circulation and/or agitation for cooling down the bath solution, but there is no need to add any oxygen containing gas. Thereby, every kind of foam is tried to be avoided, as foam is dangerous at high voltages as there may occur short cuts.

10. **The Lowenheim** text for Electroplating teaches in the middle of page 135 that surfactants are used in bright-nickel plating to promote disengagement of hydrogen bubbles at the cathode and on page 135, last but one paragraph, that surfactants stable in a strongly oxidizing medium permitted the use of foam producers that inhibit chromic acid spray and may render unnecessary the provision of strong ventilation over the tanks. But in the art of anodizing for aqueous compositions of the present application, there is no problem with hydrogen generation. It does not have any influence on the anodizing process. The gas generation cannot be avoided at anode and at cathode, but there is no need to have it and the hydrogen gas generated is not used for any

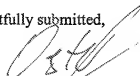
purpose. Further on, Lowenstein mentions there spraying, but here is immersion in the anodizing solution. In the Lowenstein process, the coating is formed on cathode, but at the present invention the coating building is going only on anode. There are no also hazardous gases or vapours that require strong ventilation or produce any foam for inhibition.

11. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Respectfully submitted,

By

Date


Ilya Ostrovsky

2. 11. 2009